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ABSTRACT

Decision making processes among older adults were investigated within the context of grocery selection, using a stimulus array involving two product classes (bread and cheese) with 10 items per class. The sample (N=580) was stratified by sex, household status (living alone or with spouse), and age, employing three age groupings: 25-34 (young), 65-74 (younger-old), and 75 and up (older-old). Paired similarity comparisons, attribute ratings, and preference rankings of products were obtained, as well as reactions to the decision task. Product decision processes do not appear to differ by age. Rather, result patterns show that the two product classes evoke very different responses, with bread choices more predictable and cheese choices both more variable and more important to subjects. (Author)

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DECISION PROCESSES AMONG THE ELDERLY: DO THEY DIFFER?

Product decision making procedures among older adults are the concern of the present study.[1] While the proliferation of products and information about products has created difficult and important decision problems across population groups, the elderly merit special research attention for several reasons. First, cognitive limitations often attributed to aging (e.g., slower information processing, weakened memory) would be likely to aggravate the difficulty of managing extensive arrays of product information and enhance the probability of non-optimal choices. Second, social and situational variables thought to influence the character of decision making define the elderly as a group at risk. For instance, health constraints associated with age increase the importance of making "good" choices, while income constraints render each purchase decision more consequential. In addition, such factors as sex, household size, and social role are likely to affect decision making; however, these variables have received little attention in studies of cognition and aging.

The investigation reported here attempts to determine how older subjects as compared with younger subjects: (a) perceive and characterize products, (b) weight and integrate product information, (c) arrive at decisions of varying optimality, and (d) subjectively react to the choice making situation. In every instance, our primary interest was to determine the extent to which age, in contrast with social and situational variables, accounts for significant differences in outcomes.

SUBJECTS

All participants were residents of Los Angeles, living in private households and regularly shopping for food in markets. Recent SMSA census data determined the initial recruiting plan, intended roughly

[1]This study was supported by funds from the National Science Foundation under Grant No. A?R75-20134.

to match, on demographic selection variables, the actual target population: older adults who are functioning in the community and able to read and respond to experimental materials, and a comparison group of young adults whose living situation is relatively similar. Thus, in addition to age, the variables sex and living situation were included in sample stratification to insure representation of major categories of the older population. (To simplify an already complex sampling task we eliminated from analyses the data from nonwhite participants, and the recruiting setting largely eliminated the very wealthy and the very poor.)

The older subjects were contacted at sites where National Nutrition Programs for the Elderly, funded through OAA Title VII, provide low-cost meals. These programs are located primarily in small city parks, Senior Citizens' Centers, and church or club halls. The comparison group of young adults was obtained at an office of the California State Employment Service, where the procedures were conducted; as persons surviving on unemployment, younger subjects were similar in income terms to the older group. Each subject was paid $5 to take part in one 1 1/2-hour group session, usually with four to six others of the same age.

Table 1

Attained Sample

Household size: Sex	Young x age = 30	Young-Old x age = 70	Old-Old x age = 80	
1-person: Man	70	57	41	168
Woman	47	89	46	182
2-person:				
Man with Spouse	42	40	--	82
Woman with Spouse	40	63	--	103
Woman with Other Adult	--	45	--	45
	199	294	87	580

Within the stratification frame, subjects were randomly assigned to one of the two product classes, bread or cheese. In all, the N was 286 for bread and 294 for cheese.

PROCEDURES

The study was presented to subjects as concerned with food selection, how people make choices among grocery products. The two classes of products were chosen because they are frequently purchased by older people and vary considerably along dimensions of nutrition, price, and preference. For each product class we prepared ten color photographs of commonly available items (e.g., a store brand item, a brand name item, a specialty item). All subjects used one response form, prepared in large print type for easy legibility.

Participants were seated around a table, and each was provided with a laminated set of the product pictures along with a response booklet. Although each person worked individually, the research administrator gave instructions to all jointly. Pacing was adjusted by dividing the procedure into subsections with intervening rests so that all members of a group finished at about the same time. Subsection tasks were done in one standard sequence, with counterbalancing of items within sections.

Sequence	Decision Tasks
Part I	Compare the 10 products pair by pair on a scale of similarity from 1 = very much alike to 5 = very different (45 comparisons).
Part II	Indicate ideal preference level for each of 7 attributes of products (nutrition, taste, texture, calories, price, package information, and brand), and rate the importance of each attribute on a 5-point scale.
Part III	For each of the 7 attributes, rate each of the 10 products, using 5-point scales for all but "brand" (3 points).
Part IV	Rank the 10 products "in order from best to worst."

After the completion of these tasks, participants responded to several additional questions about themselves and their reactions to the tasks. At the very end, they were given the picture cards for the alternate product set and asked for an overall preference ranking. The correlation between the two sets of rankings was +.83 for bread and +.85 for cheese, an indication that familiarity in the sense of having spent over an hour rating a picture set did not noticeably alter what might have been the initial preference ranking.

RESULTS

Multidimensional scaling was undertaken to see whether stimulus sets were perceived similarly by older and younger subjects. The primary data base for these analyses was subjects' 45 directly judged distances (dissimilarities) between items in a product class (Part I). For comparison purposes, we also examined the stimulus space in terms of inter-item (Euclidean) distances derived from product attribute ratings (Part III). Correlations between distances generated in these two quite disparate ways were positive, significant, and respectably high, as were the correlations between the judgments of older and younger subjects (Table 2).

Table 2

Correlations of Distance Scores on 45 Item Pairs

	Bread	Cheese
Direct X Derived: Old	53	67
Young	50	63
Old X Young: Direct	95	92
Derived	88	79

Proximity matrices of directly judged (dis)similarities aggregated over all old and all young subjects were input to KYST (a nonmetric) and INDSCAL (a metric) multidimensional scaling programs for a monotone fit in three to one dimensions. For both product classes, using both scaling methods, a two-dimensional solution adequately represented stimulus configurations: average stress (KYST) = 0.07; average mean square correlation coefficient (INDSCAL) = .82. Moreover, as the distance correlations above suggest, solutions for both old and young subjects are highly congruent. Figs. 1 and 2 present superimposed two-space configurations for the two subject groups. Actual products[2] identified by alphabet code are:

[2]Rating results identified by actual product name may not be used in advertising or for any commercial purpose.

	BREADS	CHEESES
A	Fresh Horizons Wheat	Fisher Low Fat
B	Northridge Honey Egg	Maybud Gouda
C	Von's Whole Wheat	Von's Jack Cheese
D	Pioneer French Rolls	Kraft Old English Spread
E	Oroweat Whole Wheat	Knudsen Cottage Cheese
F	Foix Italian Bread	Velveeta
G	Pepperidge Farm Rye	Kraft sliced American
H	Wonder White	Philadelphia Cream Cheese
I	Hollywood White	Von's Cheddar
J	Northridge White	Cracker Barrel Cheddar

("Von's" items are store brands in the study location.)

That the configurations produced by all subject groups are very coherent is further supported by average subject correlation coefficients (INDSCAL) of .91 for bread and .89 for cheese. We concluded that, in terms of undirected similarity judgments, older and younger subjects have markedly comparable perceptions of the product decision stimuli.

We next sought to determine the extent to which product decisions were a reflection of beliefs about the product attributes included in the study. For summary purposes, multiple regression analyses were performed, with the overall average rank of an item as the dependent variable and mean attribute ratings as predictor variables. Table 3 presents, within each product class, for the combined old and young sample, the first two predictors and the multiple R for each of the ten items.

Table 3

Multiple Regression of Attribute Ratings on Product Preference Ranks

(First Two Predictors Only)

	BREAD	CHEESE
A	Nutrition, .47; Brand, .49	Nutrition, .19; Texture, .20
B	Taste, .23; Package Inform, .30	Nutrition, .35; Brand, .37
C	Nutrition, .42; Texture, .46	Nutrition, .22; Calories, .27
D	Taste, .26; Nutrition, .31	Nutrition, .24; Brand, .26
E	Brand, .25; Texture, .32	Nutrition, .21; Taste, .26
F	Nutrition, .24; Brand, .32	Texture, .28; Nutrition, .34
G	Nutrition, .23; Texture, .26	Nutrition, .34; Taste, .35
H	Nutrition, .49; Package Inform, .51	Nutrition, .23; Package Inform, .2
I	Nutrition, .35; Package Inform, .40	Nutrition, .19; Calories, .22
J	Nutrition, .37; Brand, .42	Nutrition, .30; Texture, .36

As Table 3 indicates, rated nutrition was generally the best predictor of a product's preference rank. It is further apparent from the table that bread choices are substantially more predictable than cheese choices, although in no case does any one rated attribute account for more than 24 percent of the variance in rank of a single item.

For the set of attribute ratings and the set of preference rankings, the value of the cannonical correlation for older subjects was for breads .90 and for cheeses, .84; within younger subjects, cannonical correlation values between ratings and rankings for breads and cheeses were both .99. While these values are all significant at the .05 confidence level or better, it is apparent that for older subjects the attributes singled out for study more adequately predict bread rankings than cheese rankings.

The relationship between one attribute, rated nutrition, and product preference deserves special attention both because of the observed salience of nutrition in predicting rankings and because of the importance of nutritional decisions in old age. The correlation between rated nutrition and preference rank among older subjects was 1.00 for breads and .66 for cheeses; among younger subjects the correlation was .78 for breads and .86 for cheeses (Table 4). Here, too, it is evident that product class importantly influences results. The relationship between rated nutrition and product preference is much stronger among older than younger subjects for breads; however, for cheeses the relationship is stronger among younger than older subjects. Apparently age does not influence ability to use nutritional criteria for decision making, although it seems to affect which criteria are applied in given decision situations.

To evaluate decision outcomes in terms of subjective as well as objective standards, "D" scores were created for each participant by taking the square root of the sum of the squared differences between each product's rating on an attribute and the ideal level preferred for that attribute. Correlations between these ideal-discrepancy scores and preference rankings indicate the extent to which participants' product

decisions reflect their own product standards for the seven attributes investigated.[3]

In addition, product decisions were evaluated in relation to four objective product characteristics: total item price, unit price, nutrition per serving, and nutrition per unit price (both these last as ranked by nutritional gerontologists). Correlations between these product measures and preference rankings indicate the extent to which choices reflect objective purchase price and nutritional considerations. Table 4 shows average correlations among outcome measures and participants' attribute ratings.

Results of analysis of variance using age, sex and household size as independent factors (cf. Table 1) indicated that while the correlation between product preference rank and discrepancy from ideal is significantly higher for younger subjects ($F = 22.01$, $p < .001$), older subjects come closer on an absolute basis to meeting their own ideal standards for both product classes.

While correlations of preference and price are generally low, older subjects' choices are significantly more associated with total item price ($F = 9.82$, $p < .002$); and with unit price ($F = 44.44$, $p < .001$). Finally, for cheese only, younger subjects' choices are more strongly associated with objectively assessed nutrition per serving (Age X Product $F = 15.81$, $p < .001$) and nutrition per unit price (Age X Product $F = 21.47$, $p < .001$); for bread the objective nutritional correlations reflect no significant age differences.

We conclude that product decision processes per se do not appear to differ by age. Rather, result patterns show that the two product classes evoke very different responses, with bread choices more predictable and cheese choices both more variable and more important to subjects.

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[3] When attribute ratings were weighted according to the importance judgments supplied by participants, the pattern of correlations remained unchanged but all values were slightly lower.

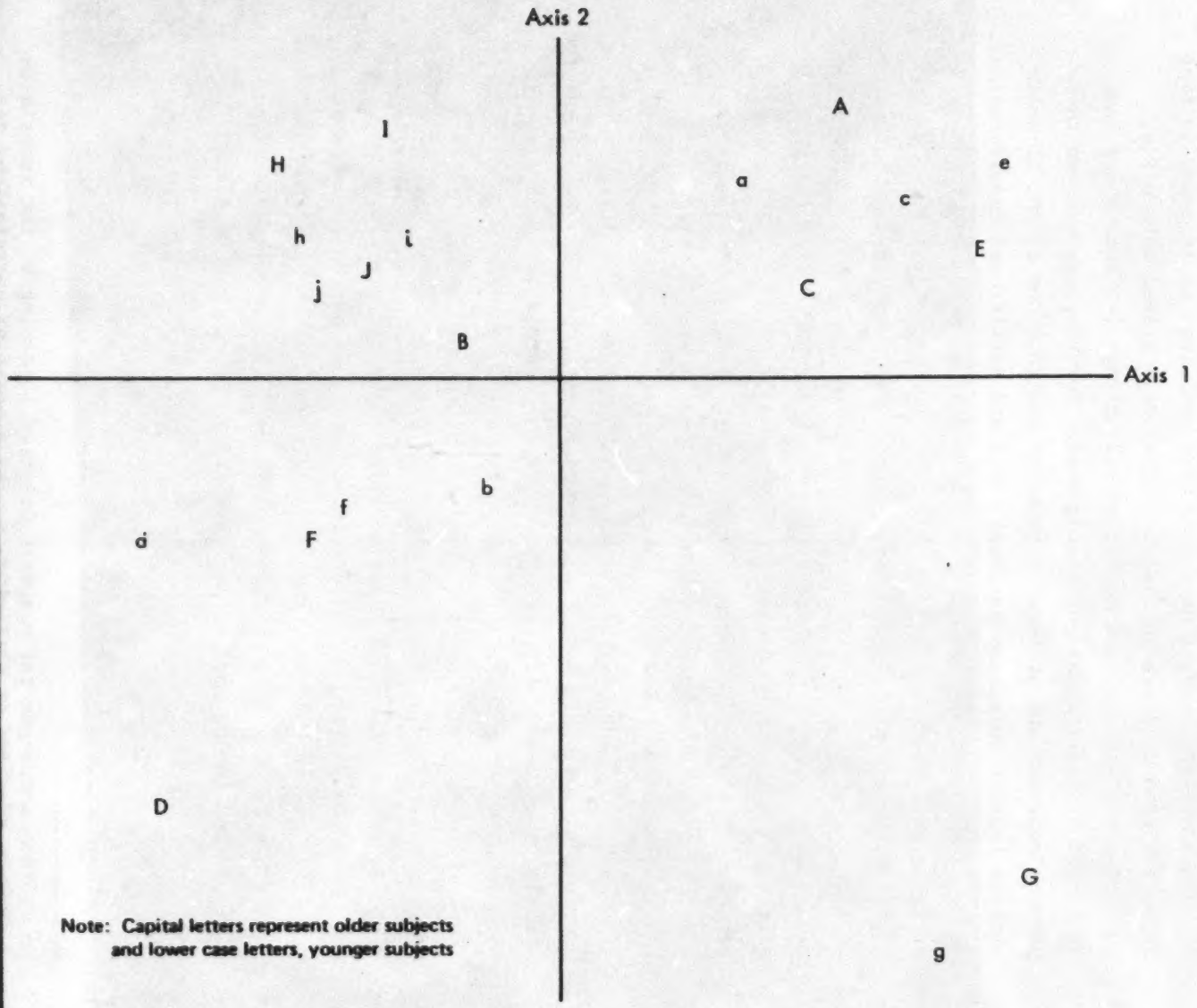

Fig. 1. Stimulus configurations obtained from KYST analyses of older and younger subjects' direct dissimilarity estimates for product 1 (breads)

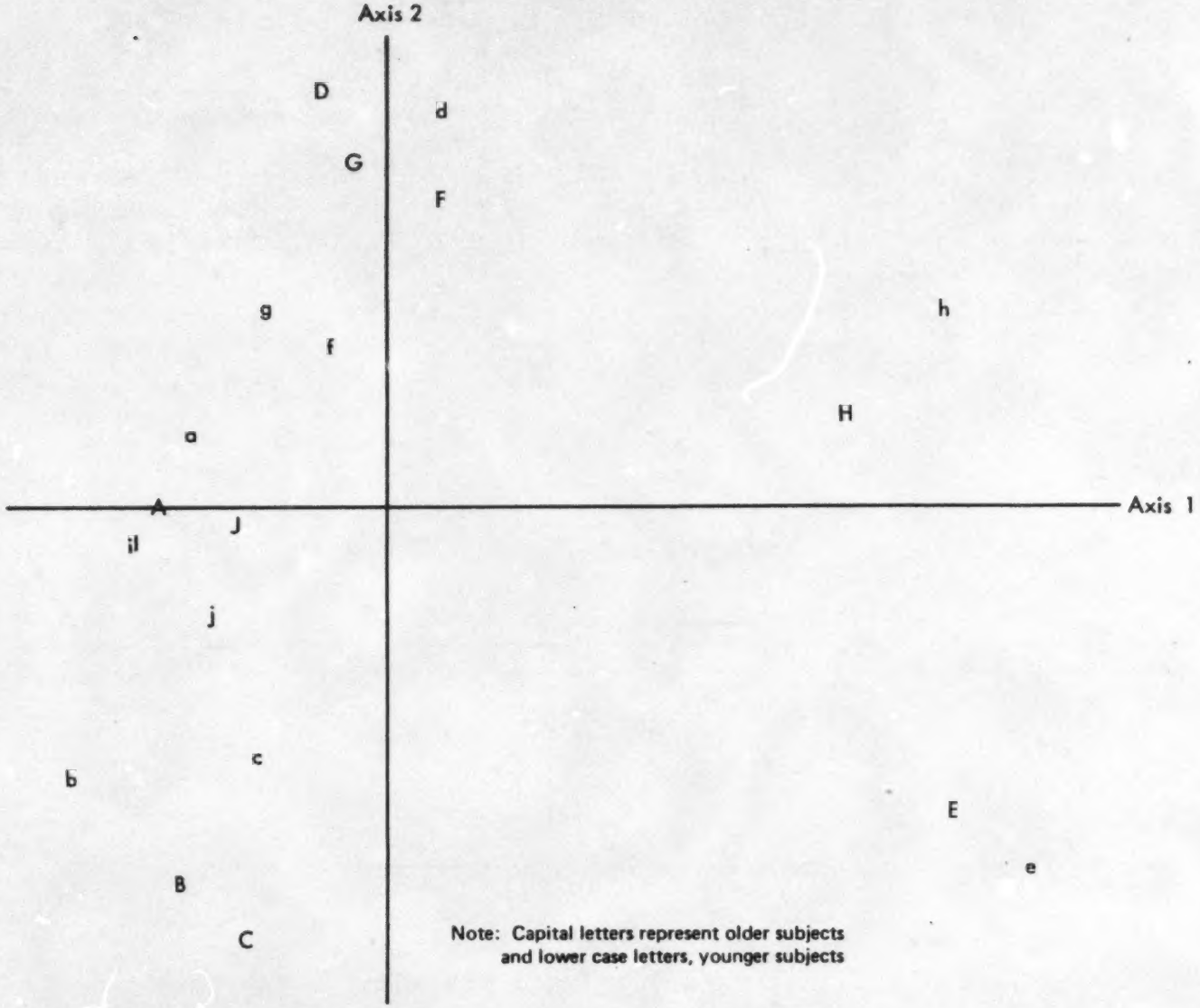

Fig. 2. Stimulus configurations obtained from KYST analyses of older and younger subjects' direct dissimilarity estimates for product 2 (cheeses)

INTERCORRELATIONS AMONG RATED ATTRIBUTES, OBJECTIVE ATTRIBUTES, AND OVERALL PREFERENCES: BREAD*

	RATED ATTRIBUTES							OBJECTIVE ATTRIBUTES				
	NUTRITION	TASTE	TEXTURE	CALORIES	PRICE	PACKAGE INFORMATION	BRAND	ITEM PRICES	UNIT PRICE	NUTRITION PER SERVING	NUTRITION PER UNIT PRICE	OVERALL PREFERENCE
RATED ATTRIBUTES:												
NUTRITION		61	26	42	25	38	14	25	-13	94	76	78
TASTE	33		84	-21	25	30	05	21	-33	62	42	89
TEXTURE	55	70		-26	08	32	-04	09	-57	24	12	75
CALORIES	-66	-28	-55		50	-07	-17	44	37	52	66	-09
PRICE	-34	-67	-84	51		-07	-60	93	46	52	75	06
PACKAGE INFORMATION	78	06	45	-21	-21		05	24	-28	22	18	39
BRAND	39	-36	11	-56	-11	30		-31	00	-01	-25	20
OBJECTIVE ATTRIBUTES:												
ITEM PRICE	18	02	09	21	43	33	-09		53	46	72	-02
UNIT PRICE	-20	-57	-51	42	76	10	23	53		08	34	-54
NUTRITION PER SERVING	88	30	54	-33	-22	88	31	46	08		90	69
NUTRITION PER UNIT PRICE	65	17	33	-04	09	77	08	72	34	90		39
OVERALL PREFERENCE:	100	33	55	-66	-34	79	39	18	-20	88	66	

*OLD SAMPLE, LEFT HALF; YOUNG SAMPLE, RIGHT HALF.

Table 4

INTERCORRELATIONS AMONG RATED ATTRIBUTES, OBJECTIVE ATTRIBUTES, AND OVERALL PREFERENCES: CHEESES*

	RATED ATTRIBUTES							OBJECTIVE ATTRIBUTES				
	NUTRITION	TASTE	TEXTURE	CALORIES	PRICE	PACKAGE INFORMATION	BRAND	ITEM PRICE	UNIT PRICE	NUTRITION PER SERVING	NUTRITION PER UNIT PRICE	OVERALL PREFERENCE
RATED ATTRIBUTES:												
NUTRITION		12	30	21	04	-27	-48	07	-14	72	72	86
TASTE	34		73	-28	-55	-63	-65	-25	-73	11	-05	19
TEXTURE	-06	47		09	-73	-37	-68	-53	-64	46	17	57
CALORIES	-65	-33	18		03	-07	-35	-27	21	55	62	12
PRICE	-34	-65	-61	12		26	35	75	68	-04	16	-23
PACKAGE INFORMATION	17	-55	-47	-30	36		54	-05	27	-04	04	-25
BRAND	34	06	-11	-29	-38	45		13	68	-62	-55	-42
OBJECTIVE ATTRIBUTES:												
ITEM PRICE	-38	-56	-50	19	89	-11	-56		29	-15	08	-14
UNIT PRICE	-04	-65	-66	16	54	48	46	29		-15	03	-17
NUTRITION PER SERVING	19	01	57	39	-12	-27	-29	-15	-15		92	66
NUTRITION PER UNIT PRICE	06	-22	34	51	08	-25	-41	08	-03	92		69
OVERALL PREFERENCE:	66	-36	-39	-16	09	41	55	-05	63	26	30	

*OLD SAMPLE, LEFT HALF; YOUNG SAMPLE, RIGHT HALF.

Table 4 (continued)